

Postaural versus Transcanal Underlay Myringoplasty: A comparative Study

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ABSTRACT

Background: Tympanic membrane perforations are most commonly treated with myringoplasty. The most commonly used approaches in myringoplasty are postaural, transcanal and endaural.

Methods: A retrospective analysis of records to study and compare the results of postaural approach and transcanal approach for underlay myringoplasty in 80 cases of inactive (mucosal) chronic otitis media with perforations was undertaken at a tertiary care centre. Patients were divided into two groups of forty each. Group A underwent postaural approach underlay myringoplasty and group B underwent transcanal approach underlay myringoplasty.

Results: The overall graft uptake of postaural approach underlay myringoplasty was 87.5% with an average post-operative hearing gain of 15.60 dB as compared to 82.5% graft uptake in transcanal approach underlay myringoplasty group with an average post-operative hearing gain of 13.90dB.

Conclusion: The results of postaural approach underlay myringoplasty are comparable to transcanal approach underlay myringoplasty. The choice of the surgical approach should be determined not only by the location and size perforation but also the size and shape of the external auditory canal.

Key Words: Inactive (mucosal) chronic otitis media; Tympanic membrane perforation; Post aural approach; Transcanal approach; Underlay myringoplasty.

INTRODUCTION

Chronic suppurative otitis media (CSOM) has been most important cause of middle ear disease since pre-historic times. Common sequels of chronic otitis media are tympanic membrane perforation, hearing loss and otorrhoea. Inactive (mucosal) chronic otitis media with perforation is commonly treated with myringoplasty. Classic methods for reconstruction of tympanic membrane (TM) perforation are underlay and overlay graft technique. Temporalis fascia graft is most commonly employed graft material in myringoplasty¹. The surgical exposure for tympanoplasty should permit clear visualization of the perforation. Myringoplasty can be performed through postaural, transcanal or endaural approach to middle ear. Each of these approaches has their advantages and disadvantages and the otologic surgeon should be familiar with them². The aim of this retrospective study was to evaluate and compare the postaural and transcanal approach in underlay myringoplasty.

MATERIAL AND METHODS

This retrospective study included eighty patients suffering from inactive (mucosal) chronic otitis media with perforation who underwent myringoplasty at department of Otorhinolaryngology, Pt. B.D. Sharma Post Graduate Institute of Medical Sciences, Rohtak Haryana (India) from January 2009 to December 2012. It included patients of either sex in the age group of 18-40 years who had unilateral or bilateral inactive (mucosal) chronic otitis media with central perforation, dry ear for minimum period of 4 weeks and air-bone gap of more than 25 dB. Patients with wet ears, infection in the nose or throat, a previous history of ear surgery and hearing loss more than 60dB were excluded.

The details of history and findings on general physical and otorhinolaryngological examination were noted. Hearing threshold levels using pure tone audiometry test were noted. These patients were divided into two groups. Group A: 40 patients who underwent postaural approach underlay myringoplasty and Group B: included patients operated with transcanal approach underlay myringoplasty. These groups were matched with respect to all factors affecting the outcome of procedure. All patients included in the study were operated under local anaesthesia. Group A patients were operated using postaural underlay myringoplasty and group B patients were operated using transcanal underlay myringoplasty. Post operatively all patients were given oral antibiotics, antihistamines and analgesics. Patients were

discharged from the hospital after 24 hours of surgery with instructions to take adequate precautions to prevent the entry of water into the ear canal. They were advised to avoid blowing of nose or lifting heavy weights. Further follow up was done on out-patient basis for a minimum period of 3 months. Patients were followed up on 10th post-operative day, and then at 4th, 8th and 12th week. At 12th week a pure tone audiogram was taken.

The aim of the study was to analyze the graft take-up rate and functional results. The functional outcome was assessed by the pure-tone audiometry. The difference between the pre and post-operative values at frequencies 500, 1000, 2000, and 4000Hz were assessed. Parameters noted on follow-up of both groups were compared.

RESULTS

In group A out of 40 there were 24 males (60%) and 16 females (40%), while group B included 25 males (62.2%) and 15 females (37.5%). Patient's age in both groups ranged between 18 to 45 years. Maximum patients were in the age group 18-25 (group A 24 cases and group B 28 cases) followed by 26-35 years (group A 11 cases and 7 cases in group B), and 36-45 years (group A 5 and group B 5). All the patients in this series had a history of ear discharge in the past, though the ear was dry for at least four weeks before they were taken up for myringoplasty. In group A 27(67.5%) patients had history of ear discharge for 0-3 years, 13(32.2%) for 4-6 years. In group B, 14(35%) cases were having ear discharge for 0-3 years and 19(47.5%) had discharge for 4-6 years while 7(17.5%) had discharge for 7-9 years.

Out of the 40 patients in group A, 34(85%) patients had unilateral perforation while 06(15%) had bilateral perforation. In group B 32(80%) had unilateral perforation while bilateral perforation was observed in 8(20%) cases. In group A subtotal perforation was seen in 30(75%) cases and 10(25%) cases had large central perforation, while in group B 20(50%) cases had subtotal perforation, 12(30%) cases had large central perforation and medium perforation was noted in 8(20%) cases. Handle of malleus was medially retracted in 2 (5%) cases in group A and in 4(10%) cases in group B. Mucoid discharge was noted in 2 (5%) cases each in group A and group B.

Tuning fork test was done in all patients with 512 Hz frequency tuning fork and results were compared with the audiogram. In groups A 38 (90%) patients had hearing loss in the range of 25-40dB and 2(05%) cases had hearing loss in the range of 41-55dB. While in group B 36 (90%) cases had hearing loss in the range of 25-40dB and 4(10%) cases had hearing loss in the range of 41-55dB.

In the follow up period discharge was noted in 5(15%) patients in group A and 7(17.5%) cases in group B. The discharge resolved with change of antibiotic in all cases. However, in group A 4(10%) patients had graft rejection and 1(2.5%) had residual perforation. In group B 1(2.5%) case had residual perforation and 6(15%) had graft rejection. The overall graft take-up rate in group A was 87.5% and while in group B it was 82.5%.

Hearing levels were assessed at 3 months. In group A the average preoperative hearing level was 35.85 dB while the average postoperative hearing level was 20.25dB, giving an average postoperative hearing gain of 15.60 dB. Majority of patients 28(70%) had a gain in the range of 11-20 dB; 04 (15%) patients had a gain of more than 20 dB. Three (7.5%) had 6-10dB gain and 5(12.5%) cases had no hearing gain. The overall hearing improvement was seen in 87.5% cases. In group B the average preoperative hearing level was 36.60 dB with average postoperative hearing level of 22.70dB thereby average hearing gain of 13.90 dB. Twenty eight (70%) patients had a hearing gain of 11-20 dB, while 2(5%) had gain of > 20 dB. Rest 3(7.5%) patients had gain of 6-10 dB and 7(17.5%) had no gain of hearing. Overall hearing improvement was seen in 82.5% cases. (Table-I)

Legend to Table-I: Showing comparative Follow-up Results of Postaural myringoplasty (Group A) and Transcanal Myringoplasty (Group B)

OVERALL FOLLOW-UP RESULTS

		Group A	Group B
1	Cases operated	40(100%)	40(100%)
2	Cases followed	40(100%)	40(100%)
3	Successful closure	35(87.5%)	33 (82.5%)
4	Residual perforation	01(2.5%)	01(2.5%)
5	Graft rejection	04(10%)	06(15%)
6	Anterior sulcus blunting	00	00
7	Graft lateralization	00	00
8	Hearing improvement	Hearing gain in dB	Hearing gain in dB
	0-5	05(12.5%)	07(17.5%)
	6-10	03(7.5%)	03(7.5%)
	11-15	16(40%)	13(32.5%)
	16-20	12(30%)	15(37.5%)
	>21	04(10%)	02(5%)

DISCUSSION

A retrospective comparative study was undertaken to analyze the anatomical and functional results of the surgery using postaural and transcanal approaches of underlay myringoplasty. In the present study age group ranged from 18-45 years. In our study males (61.25%) outnumbered the females (38.75%). In the present study duration of discharge varied from 0-9 years. Discharge usually varied from mucoid to mucopurulent and was not foul smelling. However, no co-relationship was observed between the duration of ear discharge and success of myringoplasty in our study. This is in accordance with the observation made by Doyle³.

In present study, a total of 30(75%) cases in group A and 20(50%) cases in group B patients had subtotal perforations(Grade V), while 10(25%) cases in group A and 12(30%) cases in group B had large central perforations(Grade IV) and 08(20%) cases in group B had medium perforations. In the present study bilateral disease was present in 6(15%) cases in group A and 8(20%) cases in group B. However, no correlation was observed between the bilateral involvement and the successful outcome of tympanoplasty. This is in accordance with the study done by Smyth.⁴ Middle ear mucosa was healthy in most of the cases and mucoid discharge was seen in 2(5%) cases in group A and equal number in group B 2 (5%). However, studies indicate that the presence of mucoid discharge is not significant in the surgical outcome.⁵

In the follow up at 4th week discharge was present in 5 cases of group A. Out of these five cases, four developed graft rejection and one developed residual perforation. While in group B discharge was seen in seven cases, out of which 6 patients developed graft rejection and one developed residual perforation. The overall graft uptake rate was 35(87.5%) group A compared to 33(82.5%) of group B.

Hearing loss in the present study varied from mild to moderate degree (Table-1). The average pre-operative hearing loss in group A was 35.85 dB while the average post-operative hearing loss was 20.25 dB giving an average post-operative hearing gain of 15.60 dB. Majority of patient 28 (70%) had a gain in the range of 11-20 dB, and four cases (10%) had more than 20 dB gain, 3 cases had 6-10dB (7.5%) gain and five cases (12.5%) had no gain, In group B, the average pre-operative hearing loss was 36.60 dB with average post-operative hearing loss of 22.70 dB with an average hearing gain of 13.90 dB. Twenty eight (70%) cases achieved a hearing gain in range of 11-20 dB while two (5%) case had a hearing gain of >20 dB, 3(7.5%) had gain of 6-10dB while 7(17.5%) had no gain. (Table-1)

Sergi et al in a comparative study of underlay and overlay myringoplasty reported a graft take-up rate of 94.2% in underlay group⁶. In the overlay technique the graft uptake was 91.2%. Sharma et al. in a comparative study of transcanal, endaural and postaural approaches reported a success rate of 73.3%, 83.33% and 86.66% respectively⁷. Al-Ghamdi in his study of postaural versus transcanal route did not find any significant difference⁸. Quraishi & Jones reported a success rate of 94% with transcanal route and 85% in endaural and postaural route⁹. However, they used tragal perichondrium for transcanal route and temporal fascia for postaural and endaural group⁹. In our study temporalis fascia was used in both groups. Halim and Brogstein in their study on 218 ears reported the success rate of 79.8% in postaural approach and 78.4% in transcanal approach myringoplasty and concluded that both approaches have a comparable rate of success. The results of our study are comparable to the above studies^{7,10}.

The success rate of postaural and transcanal approach underlay myringoplasty are comparable. In postaural approach a curved incision is given in the postauricular sulcus or along the hairline posterior to the sulcus¹¹. Since the incision is concealed behind the pinna it is seldom of cosmetic concern to the patient. Postaural incision may be associated with cutaneous sensory deficit. In his study Kang et al reported that cutaneous sensory deficit may persist for about 3 months¹². Sekhar and Bhavna reported that by using "behind the groove incision", the concho-mastoid angle is better preserved than by in "the groove incision"¹³. Coskun et al reported statistically significant change in the auriculo-mastoid angle in patients who had undergone myringoplasty by post-auricular approach¹⁴. Barrett et al. in their study of 81 patients who underwent mastoid surgery with postauricular incision reported that the postauricular incision was well tolerated by most of the patients¹¹. El-Anwar and El-Aassar in a prospective study of 243 patients of postaural approach myringoplasty did not find any significant deviation of the auricle. The authors though reported postaural wound infection and dehiscence in ten cases and also reported keloid formation in two cases¹⁵. Hong et al. reported no alteration of position of external ear in 19 children operated by postaural approach¹⁶.

Transcanal approach on the other hand maintains the ear canal integrity¹⁷ but it may not be suitable in narrow or curved external auditory canal or where there is a prominent anterior overhang.

Good exposure is important for proper placement of graft. No single approach is suitable for all tympanoplasties. The surgeon should use an approach most appropriate for the patient depending not only upon the size and location of the perforation but also on the size and shape of the external auditory canal^{2,18}. An informed and written consent regarding all complications related to skin incisions should also be taken. Newer visualizing aids like endoscope can also be considered and endoscope assisted transcanal myringoplasty can be an alternative approach in curved external auditory canal or in small perforations^{19,20}.

CONCLUSION

The results of postaural and transcanal inlay myringoplasty are comparable. The choice of the surgical approach should be determined not only by the location and size perforation but also the size and shape of the external auditory canal.

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